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I, JANENE PEISKER, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2004901017 for a patent by JAMES HARDIE INTERNATIONAL FINANCE B.V. as filed on 27 February 2004.

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Seventh day of March 2005

JANENE PEISKER
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AUSTRALIA

PATENTS ACT 1990

PROVISIONAL SPECIFICATION

FOR THE INVENTION ENTITLED:-

"Batten Mounting Water Management System"

The invention is described in the following statement:-

The present invention relates generally to building construction, and more particularly to a mounting batten and an associated building method for improved moisture tolerance and water management.

The invention has been developed primarily for use in conjunction with timber framing and fibre reinforced concrete (FRC) cladding materials, in the context of housing construction. It will be appreciated, however, that the invention is not limited to this particular combination of materials or this particular form of building.

In housing and other forms of building, it is a common construction technique to form a frame from timber, steel or other suitable materials, and apply a cladding material such as FRC sheet, weatherboard, masonry, or other suitable materials over the external perimeter of the frame. The interior of the building is usually lined with plasterboard, or other suitable materials. The frame typically comprises a series of spaced apart vertically extending framing elements, known as studs, and a series of spaced apart framing elements extending generally horizontally between the studs, known as noggins. Other framing members such as top plates, bottom plates and diagonals are also typically used, as is well known and understood by those skilled in the art.

In climatic regions prone to sustained or heavy rainfall or high humidity, it is common for moisture to permeate through or around the external cladding, and into the wall cavities between the framing members. Once this moisture permeation has occurred, it can be difficult to dry the wall cavity, which results in numerous problems including rotting of framing members, moisture damage to internal lining or external cladding materials, accelerated corrosion of metal fasteners, peeling of paint on internal and external surfaces, propagation of mould, rising damp, and the like.

It is known that these problems are minimized by facilitating the drainage and ventilation of the wall cavities. One known method of achieving this is to secure a series of timber battens onto the outer faces of the vertical and horizontal framing members during construction. The external cladding sheets are then fixed to, or through, the timber battens, usually by nailing or screwing. Importantly, the battens are not coextensive with the outer surfaces of the framing members, but rather are cut short. The resultant gaps allow migration of moisture, as both liquid and vapour, within the wall cavities, around the battens, in a plane immediately behind the external cladding sheets and immediately in front of the outer faces of the structural framing members. While the precise mechanics behind these water transport and evaporation processes are

not necessarily fully understood, it is known empirically that this arrangement does in fact facilitate evaporation and/or dispersion of retained moisture, and consequential drying of the wall cavities and framing members. There are, however, difficulties and limitations associated with this technique.

Firstly, it has been found in practice that the timber battens themselves are prone to moisture absorption. This is not a useful characteristic in a system specifically intended to facilitate moisture dissipation, and inevitably impedes the drying process.

Secondly, because the timber battens cover the majority of the outer surfaces of the framing members, they inhibit the rate at which moisture that has permeated the framing members themselves is able to migrate outwardly toward the front faces of those members from where it can begin to evaporate. Accordingly, not only may the battens themselves remain wet or damp for some considerable time following moisture permeation, they also impede drying of the underlying framing members.

Another problem with conventional battens is that when used on horizontal framing members, any condensation or other water must pool and flow from one end of the batten to the other, in order to drain to the next level. In the case of standard timber framing construction using studs at 600mm centers, the water would typically need to track for up to around 500mm to the end of the batten, before reaching a vertical gap through which to flow. Even this relies on the builder being assiduous in providing the necessary gaps, inclinations, and tolerances to allow the process to occur as intended. In practice, this does not always happen.

A further problem relates to corrosion of metal fasteners. The usual method of treatment for timber battens exposed to moisture for prolonged periods involves the use of an acidic solution of copper, chromium and arsenate (CCA), which is designed to fully penetrate the timber under external pressure. If timber treated in this way remains wet for prolonged periods, as is typically the case in the present context, standard galvanized nails or screws become corroded to an unsatisfactory degree. In order to ameliorate this problem, it is possible to use stainless steel nails. However, this adds significantly to the cost of materials. Furthermore, stainless steel nails are typically not available in collated magazine form for use in nails guns. Consequently, in such situations, the builder must nail the battens to the cladding sheets by hand. This is time-consuming, inconvenient, and adds significantly to the labour as well as the material cost.

It is an object of the present invention to provide a batten and associated framing method, which overcomes or substantially ameliorates one or more of these disadvantages of the prior art, or at least provides a useful alternative.

Accordingly, in a first aspect, the invention provides an elongate batten adapted for positioning intermediate an inner wall framing member and outer wall cladding sheet to facilitate dispersion and evaporation of moisture from a wall cavity, said batten including at least one channel to facilitate migration and drainage of moisture between the batten and the framing member.

Preferably, the channel is formed in an inner surface of the batten adapted for face-to-face engagement with an adjacent outer surface of the underlying framing member. Alternatively, the channel may be formed in an outer surface of the batten adapted for face-to-face engagement with an adjacent inner surface of the overlying cladding sheet. In a further alternative, the channel may extend through the batten.

Preferably, the channel extends longitudinally to facilitate migration and drainage of moisture along the length of the batten. Preferably, the batten includes a plurality of such longitudinal channels disposed in generally parallel side-by-side relationship and extending along substantially the entire length of the batten. Preferably, the longitudinal channels are respectively formed between adjacent pairs of a corresponding plurality of longitudinal ridges, the ridges collectively defining the inner surface of the batten.

Preferably, the batten additionally or alternatively includes a transverse channel formed in the inner surface adapted for engagement with the adjacent outer surface of the framing member, to facilitate migration and drainage of moisture across the batten. Alternatively, however, the transverse channel may be formed in the outer surface of, or extend through, the batten. Preferably, the batten includes a plurality of transverse channels disposed in generally parallel side-by-side relationship.

In one preferred embodiment, the transverse channels are defined by corresponding series of apertures, slots, cutouts, or openings formed in the respective longitudinal ridges. The apertures or cutouts defining each channel may be transversely aligned, staggered or disposed in some other relationship. In this way, the transverse and longitudinal channels form a ventilation and drainage matrix adapted to permit migration of moisture in liquid or vapour form across, along and through the batten. It should be appreciated, however, that the respective channels defining the drainage

matrix may or may not be orthogonal, and the transverse channels may or may not intersect with the longitudinal channels.

In the preferred embodiment, the batten is formed from a plastics material adapted to resist moisture permeation, and to be readily cut to desired lengths using conventional sawing tools and techniques. In one embodiment, the batten incorporates pre-formed lines of weakness disposed at regular intervals, to permit the batten to be manually snapped or broken into small sections of desired length, without the need for cutting or sawing. Most preferably, the batten is formed from PVC, and is ideally formed, at least partially, by extrusion.

The batten is preferably between 30 and around 60mm, and ideally approximately 45mm in width. The batten is preferably between 10mm and around 30mm, and ideally approximately 19 mm in thickness. The batten preferably includes three longitudinal channels, each approximately 9.5 mm in width and approximately 17 mm in height. Preferably, the intermediate ridges are approximately 2.5 mm in thickness.

Preferably, the transverse channels are defined by a series of cutouts in the ridges, each cutout being generally U-shaped, with a length of around 20mm and a height of around 8mm, and space apart along each ridge at approximately 50mm between centers. In the preferred embodiment, the cutouts on adjacent ridges are staggered. Preferably, the batten is initially formed in a length of around 2400mm, but is adapted to be readily cut or broken into smaller lengths of desired size on-site.

Preferably, the outer surface of the batten is grooved, to facilitate the downward passage past the batten of water passing along the inner surface of the outer cladding material.

According to a second aspect, the invention provides a method of building construction, said method comprising the steps of:-

forming a structural frame from framing members, such that the framing members defining cavities therebetween;

securing a plurality of battens as previously defined to outer surfaces of at least some of the framing members;

applying an outer cladding material to substantially cover the framing members and the battens; such that the battens collectively form a clearance space between the framing members and the cladding material;

the battens thereby facilitating drainage and ventilation of the cavities.

Preferably, the structural frame is formed substantially from timber framing members and the method relates to construction of a wall section of a building. It will be appreciated, however, that the framing members may be formed from other suitable materials including steel, FRC or plastics, and that the construction technique may be applied to floors, ceilings, roofing sections, partitions, and the like. Preferably, the cladding material is FRC sheet. It will be appreciated, however, that any other suitable cladding material may be used.

Preferably, the battens are secured so as collectively to cover more than 50% of the combined outer surface area of the framing members to which the method is applied. Preferably, the battens are secured to the framing members by nailing or screwing. It will be appreciated, however, that any other suitable fastening means may be used, including tacking, stapling, gluing, welding, chemical bonding, frictional engagement, or mechanical engagement.

Preferably, the method includes the further step of applying an internal lining material such that the framing members are effectively sandwiched, directly or indirectly, between the external cladding material and the internal lining material. The internal lining material is preferably plasterboard. Again, however, other suitable materials may be used.

According to a third aspect, the invention provides a building or a section of a building, constructed in accordance with the method and using the battens, as defined above.

A preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

Figure 1 is a perspective view showing a batten according to the invention;

Figure 2 is a side elevation of the batten shown in figure 1;

Figure 3 is a cross-sectional view taken along line 3-3 of figure 2;

Figure 4 is a cross-sectional view taken a long line 4-4 of figure 2;

Figure 5 is a partially cutaway perspective view showing a form of wall construction using the battens of figures 1 to 4, according to the invention; and

Figure 6 is an enlarged detail taken from the top-left-hand corner of figure 5.

Referring to the drawings, the invention in a first aspect provides an elongate batten 1 adapted for positioning between an inner wall frame 2 and an outer wall

cladding layer 3, to facilitate dispersion and evaporation of moisture from the wall cavity. As best seen in figures 1 to 4, the batten includes a series of generally U-shaped longitudinal channels 10 disposed in parallel side-by-side relationship, and extending along substantially the entire length of the batten. The channels are respectively formed between adjacent pairs of ridges 11, such that the ridges effectively define the inner surface 12 of the batten. The outer surface 13 of the batten includes a corresponding series of generally V-shaped grooves 14, again disposed in parallel, side-by-side relationship and extending along substantially the entire length of the batten. In the embodiment shown, the grooves generally correspond in number and alignment with the respective ridges. This confers the advantage of maintaining a substantially uniform wall thickness in the batten. It will be appreciated, however, that this need not necessarily be the case. If desired, the outer surface of the batten may additionally or alternatively include transverse grooves (not shown).

The batten also includes a series of transverse passages or channels 15, effectively formed in the inner surface. These transverse channels are collectively defined by a series of apertures, slots, cutouts, holes or openings 16, formed in each of the longitudinal ridges 11. In this regard, it will be appreciated that each transverse passage or channel 15 is not defined by a single cutout 16, but rather by a sequence of cutouts in each of the ridges. The cutouts in each such sequence may be transversely aligned, such that the transverse channels are effectively straight, or staggered (as shown), such that the transverse channels effectively follow a zigzag or sinuate path across the batten. A combination of these or other forms of relative alignment between the respective sequences of cutouts may also be used, whereby the resultant shape of the transverse passages or channels may be regular, irregular, or a combination of both.

The net result is that the transverse and longitudinal channels 15 and 11 together form a ventilation and drainage matrix adapted, in conjunction with the grooves 14, to permit migration of moisture in liquid or vapour form across, along and through the batten, as described in more detailed below. It should be noted, however, that the respective channels, passages and grooves defining the drainage matrix may or may not be orthogonal, and the transverse channels may or may not intersect with the longitudinal channels. Ideally, however, these channels will intersect at least to some degree, to optimise the moisture dispersion characteristics.

The batten is formed from a plastics material, ideally PVC, and is thereby adapted to resist moisture permeation. This material also enables the batten to be readily cut to desired lengths using conventional sawing tools and techniques. It also incorporates pre-formed lines of weakness (not shown) disposed at regular intervals, to permit the batten to be manually snapped or broken into smaller sections of desired length, without the need for cutting or sawing.

The batten is ideally approximately 45 millimetres in width and around 19 millimetres in thickness or depth. In the embodiment shown, it includes three longitudinal channels 10, each approximately 9 to 10 millimetres in width and approximately 17 millimetres in depth. The batten includes four outer grooves 14, each approximately 1.5 millimetres in depth. The wall thickness is generally in the order of 2.5 millimetres, and the sidewalls or ridges 11 defining the respective channels approximately correspond to this thickness. The cutouts 16 each have a length of approximately 20 mm and a depth or height of approximately 8 mm. The cutouts are spaced along each ridge or sidewall at a distance of approximately 50 millimetres between centres. The batten is initially formed in lengths of approximately 2400 millimetres, but as noted above, is adapted to be cut or snapped into smaller lengths, as required.

In a second aspect, the invention also provides a method of building construction, using battens as described, to facilitate the management, control and dispersion of water. Using this method, a structural frame 20 is initially erected using framing members 21, which may be formed from timber, FRC, steel or other suitable materials. The embodiment shown uses conventional timber framing members. In the conventional manner, the frame includes horizontally and vertically oriented framing members spaced apart at appropriate intervals to define intermediate wall cavities 24. The framing members include respective inner faces 25 and outer faces 26, as best seen in figure 6. A series of battens 1 is then secured to the respective outer faces 26 of at least some, and ideally most, of the framing members 21. The battens may be secured by gluing, screwing, nailing, stapling, or other suitable fasting means.

The outer layer 3 of cladding material is then applied, using cladding sheets 30 so as to cover the framing members and the overlying battens. In this way, the battens collectively position the outer cladding material away from the framing members by a predetermined distance corresponding to the thickness of the battens, and form a

clearance space 31 therebetween. The outer cladding material is ideally formed from FRC sheet, but may alternatively the formed from timber, aluminium, cement render, masonry, plastic, or other suitable cladding materials. The cladding material is ideally fastened by nailing or screwing, but again, other suitable fasting means may be used as appropriate to the cladding and framing materials, the required strength characteristics, the prevailing climatic conditions, cost considerations, aesthetics, and other relevant factors.

The inner face of the frame is then covered with an internal lining material such as plasterboard (not shown), whereby the framing members are effectively sandwiched between the external cladding and the internal lining materials. The wall cavities may contain thermal installation, ducting for building services, soundproofing, or other materials as required. Although the construction technique has been described with reference to the wall section of the building, it will be understood that it may be equally applied to the construction of floors, ceilings, roofing sections, partitions, and the like.

Turning now to described the mode of operation of the battens in more detail, with the wall or building section formed as described, any water in liquid form that migrates into the wall cavity is able to run downwardly through the planar clearance space 31 between the framing members and the outer cladding, via the drainage matrices extending through the respective battens. From the bottom of the wall section, this water is readily directed out of the wall cavity and away from the building through appropriately positioned drainage holes, channels, gutters, ducts, pipes, or the like. Moisture in vapour form is readily able to either condense for removal with the liquid drainage water as described, or alternatively to rise in gaseous form through the same clearance space 31, again via the drainage matrices extending through the respective battens, for egress from the wall cavity through the top of the wall section.

It will be appreciated that because the battens are formed from a plastics material, they do not themselves absorb any moisture. Moreover, because they do not need to be chemically treated, they do not cause accelerated corrosion of metal fasteners, and in particular do not require the use of stainless steel screws or nails. Conveniently, the batten material is therefore readily fastenable using conventional galvanised nails in collated nail gun format.

Furthermore, the longitudinal channels 10 effectively form vapour diffusion ports, which facilitate the diffusion of water absorbed into the underlying timber framing

members. The only direct contact area between each batten and the underlying framing member is essentially four contact strips, each 2.5 mm wide, corresponding respectively to the four inner faces of the longitudinal ridges 11. This greatly increases the area of free air space above wet timber framing members, thereby providing improved drying conditions at the outer surfaces of any framing members that have absorbed moisture. These drying conditions are further improved by the cutouts 16 and associated transverse passages 15 in the battens, which allow the free movement of air through and between the individual compartments within the wall cavity. This free movement of air minimises the accumulation of moisture within the cavity, and facilitates the migration of absorbed water to the outer surfaces of the framing members and subsequent dispersion by drainage and evaporation. Also, in the case of horizontally oriented battens, any condensation or other liquid water flows are able to drain directly through the cutouts 16, rather than having to pool and flow from one end of the batten to the other, as in the case of the prior art. This means that the system is less dependent upon precise angles of inclination, end gaps and tolerances upon installation of the battens, in comparison to prior art techniques.

Because of the shape, configuration and material and properties of the battens, which are preferably formed by extrusion, the dimensional tolerances in terms of thickness, width, straightness and the like are superior to those of conventional timber batten products. Furthermore, there are no significant dimensional variations in response to changes in ambient humidity. Yet, as noted above, the battens of the present invention are far more tolerant of positional variation upon installation. They are also lighter than correspondingly sized conventional solid timber battens, readily handlable without splintering, and easy to cut. In all these respects, the invention represents a practical and commercially significant improvement over the prior art.

Although the invention has been described with reference to specific examples, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

DATED THIS 27th day of February 2004

BALDWIN SHELSTON WATERS
Attorneys for: James Hardie International Finance B.V.

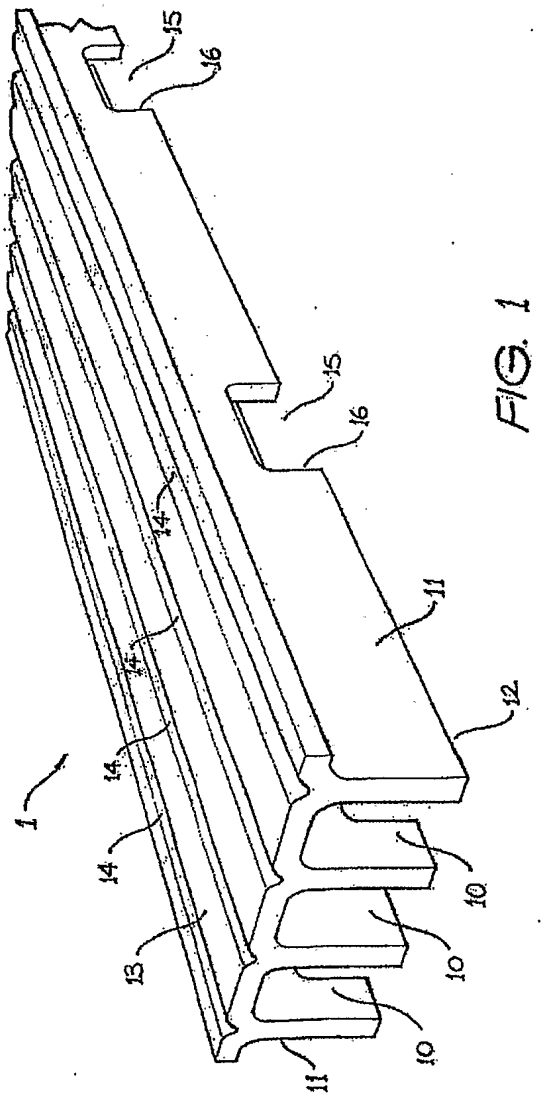

FIG. 1

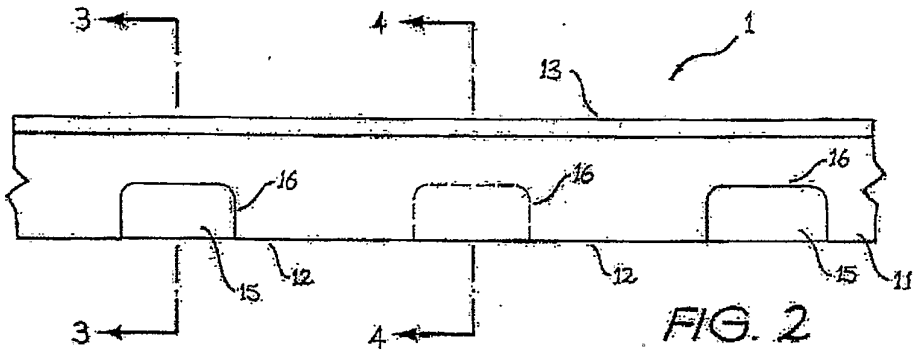

FIG. 2

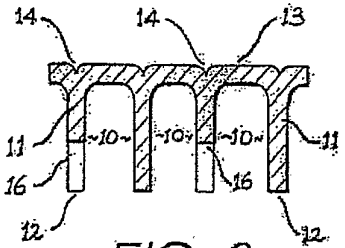

FIG. 3

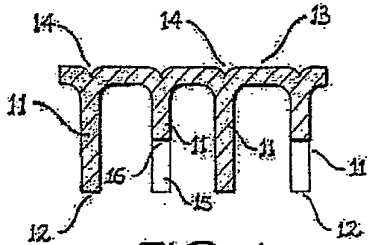

FIG. 4

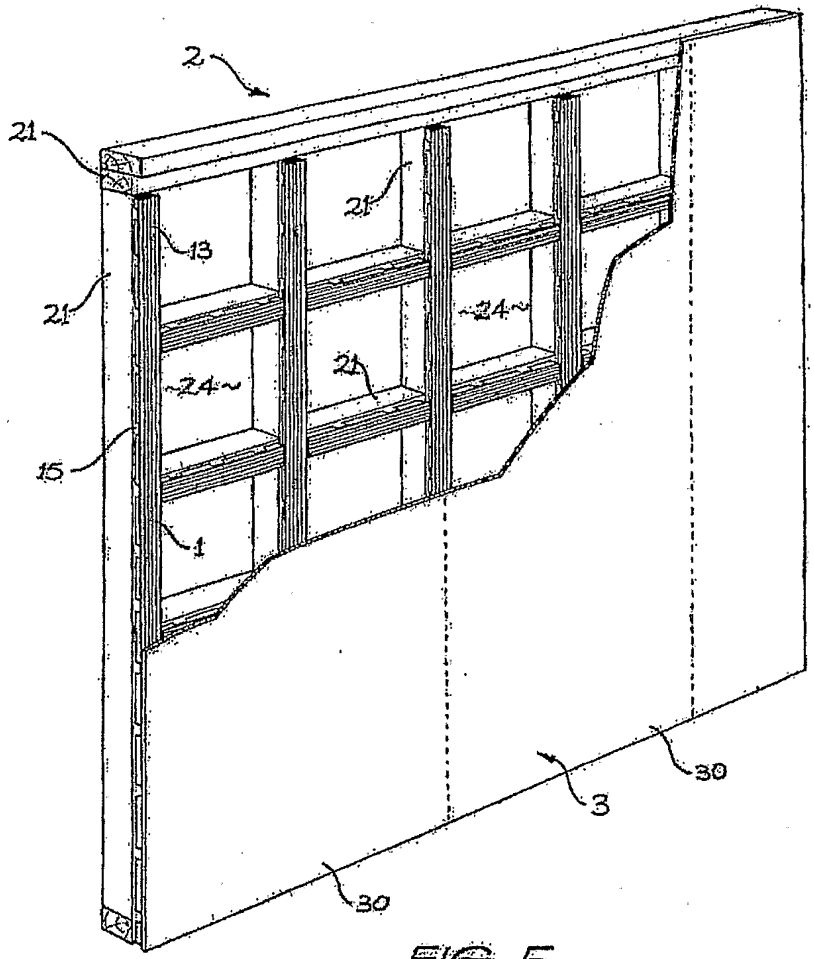

FIG. 5

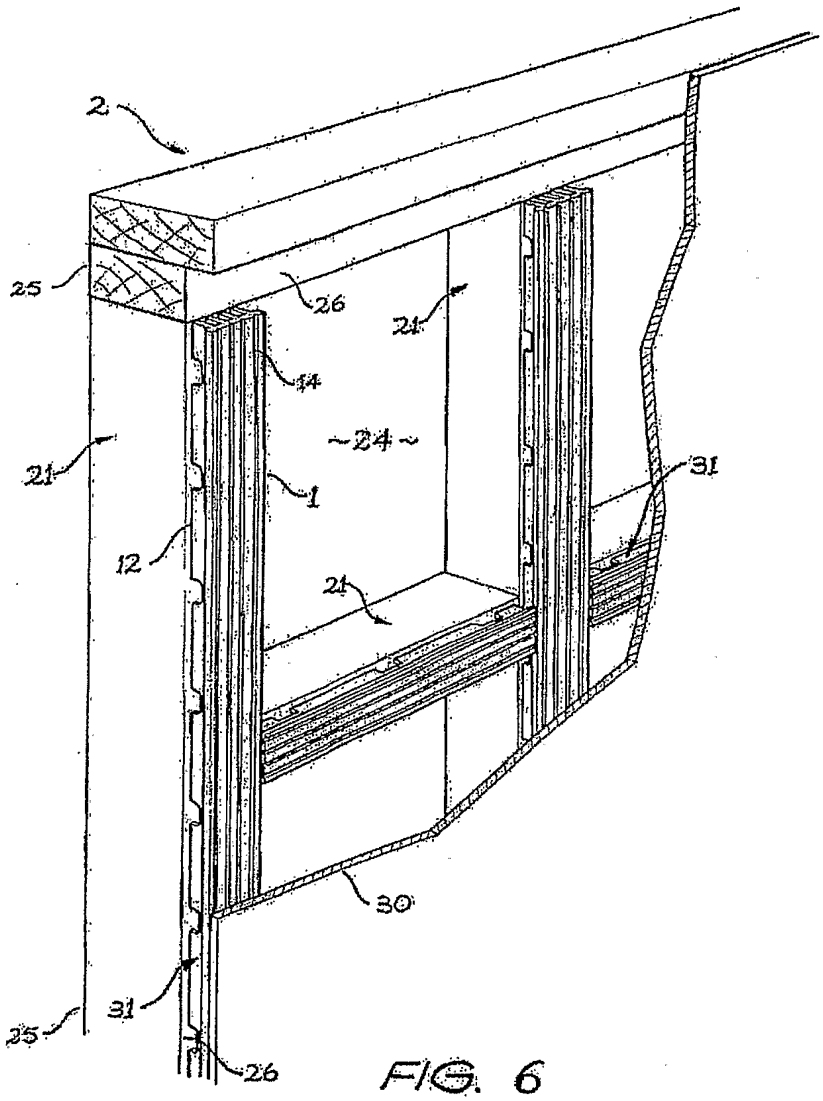

FIG. 6